BAM
Bundesanstalt für Materialforschung und -prüfung

CERTIFICATE

BAM/ZBF/002/23 (1. VERSION)

Hereby it is confirmed by the BAM Certification Body, that the

Material Beryllium copper alloy

of the manufacturer
Hebei Botou Safety Tools Co. Ltd.
No. 2 Wugang Road, Industrial Park
Botou City, Hebei Province
062150 CHINA

meets the requirements of BAM Standard operating procedure „**StAA-NEG-005**“: „**StAA zur Schlagfunkenprüfung von Werkstoffpaarungen**“ approved April 2023 and thus non-sparking tools made of this material are appropriate for use in potentially explosive atmospheres of zone 1 and/or 21 in accordance with the European Directive 1999/92/EC of all explosion groups (I, IIA, IIB & IIC) according to DIN EN ISO/IEC 80079-20-1:2020-09, if the terms and conditions set out in the annex to this certificate are complied with.
The certification is based on certification contract N° **BAM-ZBF-0002-2022-HEBEI BOTOU** dated 2022-10-24 and comprises according to standard DIN EN ISO/IEC 17065:2013 a design-type test and a manufacturer's declaration of conformity (BAM Certification system I).

Products certified by BAM may be labelled with the certification mark "BAM Design-type tested" and/or "BAM Baumustergeprüft"..

The certificate is valid until 9th July 2028.

BAM test report **23004760** as well as procedure No BZS-GS/038/22 are constituent parts of this certificate.

Bundesanstalt für Materialforschung und -prüfung (BAM)

Unter den Eichen 87, 12205 Berlin, **10.07.2023**

By order
Dr. J. Sunderkötter
BAM-Certification Officer

By order
Dr. M. Schmidt
BAM-Assessor

Distribution list: 1st Certificate holder 2nd BAM Certification Body

This certificate consists of 1 page and 1 Annex.
This certificate may only be published in full wording and without any additions. The revocable written consent shall be obtained from BAM beforehand for changed reproduction and excerpts. The German version is legally binding, except an English version is issued exclusively. Place of jurisdiction is Berlin.

Certificate No. BAM/ZBF/002/23, Annex 10th July 2023

Conditions for use of the certified material

The non-sparking tools made of the certified material "Beryllium-copper alloy" are appropriate for use in potentially explosive atmospheres of the zones 1 and/or 21 of all explosion groups (I, IIA, IIB & IIC), if the following terms and conditions are met:

- The material composition of this material shall comply with the material composition of the tested sample, namely:

    - Beryllium-Copper Alloy:
      > 99.0 % Cu+Be+Co+Ni+Fe;
      1.5 % – 2.3 % Be; > 0.2 % Co+Ni; < 1.2 % Co+Ni+Fe; hardness: HB 283-365 HRC 30-41 (see test report from Hebei Botou Safety Tools Co. Ltd. dated November 26th, 2022, received on January 17th, 2023)

- The intended use of the tools made of the certified material shall be described by the certificate holder in such a manner that the max. absorption of mechanical energy during a possible impact of the tools on steel with the composition set out in the following does not exceed 61 Nm. This corresponds to a falling height of 10 metres of a tool with a weight of approx. 600 g.

  Composition of the steel: mild steel/heat treatable steel, Steel grade 45, material No. 1.0503, not hardened according to Hebei Jingye Cut Deal Co., Ltd. dated May 17th, 2022, received on January 17th, 2023 and letter dated June 8th, 2023.

    - 0.44 % C; 0.2 % Si; 0.54 – 0.55 % Mn; 0.011 % – 0.019 % P;
      0.005 % – 0.015 % S; 0.016 % – 0.022 % Cu; 0.037 % – 0.039 % Cr;
      0.02 % – 0.036 % Ni; 0.021 % – 0,042 % Al.

  The impact plates used for testing in our laboratory were made of steel with the composition set out above. The impact plates were coated with epoxy resin powder (Fused epoxy resin powder, see letter from Botou Safety Tools Co. Ltd. dated January 17th, 2023).

- The carbon content of the mild steel/heat treatable steel as well as its hardness have a great influence on the generation of mechanically generated impact sparks. They must not be modified nor must the carbon content of 0.44 % be exceeded. The steel must not be hardened or surface hardened.

Berlin, 2023-07-10

Place, Date

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Signature BZS